

TWO PHYSICIANS, A LANDSCAPE ARCHITECT, AND MALARIA

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AN unlikely succession of circumstances in malariology links two physicians—John T. Metcalfe (1818-1902)¹ and Albert Freeman Africanus King (1841-1914)²—with a well-known layman, Frederick Law Olmsted (1822-1913), the consummate landscape architect and designer.³ When the Civil War began, Olmsted left his work on New York City's largest park to serve as Secretary-General (1861-1863) of the new United States Sanitary Commission, a quasi-official amalgam of several agencies sanctioned by Lincoln⁵ that supplied many of the medical, surgical, transport, hospital, and sanitary needs of the Union troops.

The Commission's endeavors and many of Olmsted's contributions to "...the good big work I have in hand..."⁴ are described in biographies and in the Commission's own documents. Under Olmsted's aegis, furthermore, the Commission published a series of *Military Medical and Surgical Essays*⁷ that covered such diverse subjects as hygiene and therapeutics, vaccination, amputation, pneumonia, yellow fever, etc.—in all, some 19 monographs intended for field use. Insofar as I can determine, the minutes of the seventh session of the Commission contain the only extended allusion to the *Essays*, but the records do not disclose who originated the scheme. The following is the pertinent entry in the minutes (page 78):⁸

Whereas, the absence of medical literature suitable to their professional wants at the command of our medical officers in the field, demands an effort to supply it; and whereas the medical men of our country, who are unable to do service in the field, in consequence of their occupation in the great hospitals and seats of medical learning, should do their share of labor in behalf of our officers and soldiers now in active service: Therefore, it is

Resolved, That a sub-committee of the Commission be appointed, to secure from

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such high and sound professional sources a series of papers upon the subjects best calculated to interest and profit our medical officers in the field, with the object of having said papers printed as documents of the Commission, and circulated by their agents to the surgeons and assistants of the volunteer force now in the field.

Dr. Van Buren and Dr. Agnew were, on motion, appointed such committee.

A paper on Vaccination, prepared by F. Gurney Smith, M.D., and A. Stillé, M.D., of Philadelphia, an Associate Member of the Commission, was presented; and, on motion, referred to the same committee.

Resolved, That the Executive Committee have power to print, as documents of the Commission, any papers on medical or surgical subjects approved by the Committee on Medical Publications.

The Committee on Medical Publications reported in favor of printing the paper on Vaccination submitted to them.

Resolved, That the same be printed as a document of the Commission.

Resolved, That the thanks of the Commission are due, and are hereby tendered to J. Gurney Smith, M.D., and A. Stillé, M.D., for their able paper on the subject of Vaccination.

The essays usually carried identical introductions except for the last paragraph, which addressed the specific subject at hand. The landscape architect and effective purveyor to the army's physicians signed and presumably wrote the introductions, of which the following example (from Metcalfe, 1862)⁹ is both typical and germane:

The attention of the Sanitary Commission has been directed to the fact, that most of our Army surgeons, now in the field, are unavoidably deprived of many facilities they have heretofore enjoyed for the consultation of standard medical authorities. It is obviously impossible to place within their reach anything that can be termed a medical library. The only remedy seems to be the preparation and distribution among the medical staff, of a series of brief essays or hand-books, embodying in a condensed form, the conclusions of the highest medical authorities in regard to those medical and surgical questions which are likely to present themselves to surgeons in the field, on the largest scale, and which are, therefore, of chief practical importance.

The Commission has assigned the duty of preparing papers on several subjects of this nature, to certain of its associate members, in our principal cities, belonging to the medical profession, whose names are the best evidence of their fitness for their duty.

The following paper on "The Nature and Treatment of Miasmatic Fever," belongs to this series, and is respectfully recommended by the Commission to the medical officers of our army now in the field.

FRED. LAW OLMSTED,
Secretary.

Washington, May 25th, 1862

Metcalfe's 23-page report on the miasmatic fevers, written on behalf of an anonymous committee of the Associate Members of the Sanitary Com-

mission, presents an adequate but undistinguished account of the clinical features and therapy of malaria. The paper begins, however, with a list of 13 precepts about the epidemiology of malaria which, though incomplete or in a measure inaccurate, served as the basis for A. F. A. King's speculations some 20 years later. While admitting to much general ignorance of malaria, Metcalfe felt his thoughts about malaria might prove helpful:

- 1st. It affects, by preference, low and moist localities.
- 2nd. It is almost never developed at lower temperature than 60° Fahrenheit.
- 3rd. Its evolution or active agency is checked by a temperature of 32°.
- 4th. It is most abundant and most virulent, as we approach the equator and the sea-coast.
- 5th. It has an affinity for dense foliage, which has the power of accumulating it, when lying in the course of winds blowing from malarious localities.
- 6th. Forests, or even woods, have the power of obstructing and preventing its transmission, under these circumstances.
- 7th. By atmospheric currents, it is capable of being transported to considerable distances—probably as far as five miles.
- 8th. It may be developed, in previously healthy places, by turning up the soil; as in making excavations for foundations of houses, tracks for railroads, and beds for canals.
- 9th. In certain cases, it seems to be attracted and absorbed by bodies of water lying in the course of such winds as waft it from the miasmatic source.
- 10th. Experience alone can enable us to decide as to the presence or absence of malaria, in any given locality.
- 11th. In proportion, as countries previously malarious are cleared up and thickly settled, periodical fevers disappear. In many instances, to be replaced by typhoid or typhus.
- 11th. [12th] We possess, in our materia medica, an antidote to the malarious poison, as well as a prophylactic against it.
- 13th. The propinquity of large fires will often prevent the injurious effects of malaria.

Two points merit notice: first, Metcalfe did not speculate about the causes or transmission of malaria; and second, Metcalfe's paper lay fallow for two decades until King adopted (with due acknowledgement) Metcalfe's precepts, expanded upon them, invoked the mosquito as the probable vector, and published his views in 1883 in *Popular Science Monthly*,¹⁰ a rather idiosyncratic outlet for matters medical. King had presented the same paper under a somewhat different title before the Philosophical Society of Washington, but it was published only in highly truncated form in that Society's Bulletin.¹¹ The paper in *Popular Science Monthly* occupies some 15 printed pages and is, oddly enough, characterized by King himself as an abstract. One wonders with trepidation how long the original may have been.

King pointed out that mosquito behavior was consistent with Metcalfe's postulates. For example, malaria occurs in low moist places, and mosquitoes are prevalent in such spots; temperatures over 60°F enhance the transmission of malaria and the development of mosquitoes as well; malaria can be transported for miles and so can mosquitoes, etc. To Metcalfe's postulates King added several more, some stronger than others but all tending to incriminate mosquitoes—at least in theory—in the transmission of malaria. In the end, King's list of positive arguments totalled 19, the number that has long been associated with his name in the malariologic literature.

King's unusual talk before the Philosophical Society¹¹ on February 10, 1892 suffered from poor attendance, although among those present were such dignitaries as John Shaw Billings and Robert Fletcher, despite whose presence "...the paper fell utterly flat..."¹² Before that meeting King had apparently discussed his notions about mosquitoes with the incredulous L. O. Howard and C. V. Riley at the Department of Agriculture. Wrote Howard in 1930: "I am sorry we gave him no encouragement. The idea appeared to be altogether farfetched."¹³ Indeed, according to Howard, King's lengthy abstract in *Popular Science Monthly* attracted little attention and "...received none of the favorable comment it deserved until George H. F. Nuttall recognized its remarkable character 16 years later..." when he wrote¹⁴ that by far the most masterly exposition of the [mosquito-malaria] theory was written by King. Howard noted that "As a closely reasoned argument [King's] paper was as nearly conclusive as it would be possible without actual experimental evidence. But the time was not ripe for the acceptance of this idea."¹² His belated enthusiasm aside, Howard erred in stating that "It is certain that at the time King formulated his mosquito-malaria theory, he had no knowledge... of Manson's discoveries regarding the carriage of filariasis by mosquitoes..."¹² On the contrary, in the second paragraph of his abstract, King wrote; "More recently, the researches of Dr. Patrick Manson in China, Dr. Bancroft in Australia, Dr. J. [T.] R. Lewis in India, and Dr. Sonsino in Egypt, have tended to show that the mosquito "acts as the intermediary host of *Filaria sanguinis hominis*..."¹⁰

King granted that while his arguments in favor of the mosquito-malaria hypothesis "...cannot be held to prove the theory, they may go so far as to initiate and encourage experiments and observations by which the further truth or fallacy of the views held may be demonstrated."¹⁰ However, King himself never experimented, and this, together with his odd ideas

and personality quirks, doubtless earned him the soubriquet "an armchair scientist."¹⁵

King built his mosquito-malaria edifice atop Metcalfe's epidemiology of malaria sans mosquitoes. The work of both King and Metcalfe, however, traces back to Frederick Law Olmsted,¹⁶ who interrupted his creative endeavors in New York's Central Park to organize and run a wartime Sanitary Commission without precedent in scope and complexity. The vision of that extraordinary man is evident in the Commission's publications, including the *Military Medical and Surgical Essays* and the Metcalfe essay which ultimately sparked King. The Commission itself, lest one doubt its broader and later impact, strongly influenced the birth of the American Red Cross.

Olmsted provided his own grace note to events entrained through Metcalfe in 1862: nearly 50 years after the Civil War, when it had been demonstrated that mosquitoes were a menace to health, Olmsted himself wrote an informative little paper on mosquito abatement.¹⁷

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NOTES AND REFERENCES

1. Metcalfe hailed from Natchez, Mississippi, and received his schooling at West Point and later in medicine at the University of Pennsylvania and in Europe. He developed a large practice in New York and became a professor and consulting physician. Metcalfe published little beyond two papers in *Military Medical and Surgical Essays*.
2. A. F. A. King immigrated as a child from England to the United States, and trained in medicine at the predecessor of George Washington University and at the University of Pennsylvania. He served with the Union forces during the Civil War, and later became a teacher and Dean at George Washington. He was a recognized authority in obstetrics and gynecology, professional specialties he shared with an illustrious predecessor in the theory of infectious disease, Josiah Clark Nott of Mobile, Alabama. Many considered King an eccentric because of his unorthodox views about malaria.
3. Olmsted designed New York City's

- Central and Prospect Parks, Boston's Public Gardens, and many other public and private grounds around the country. He was also instrumental in helping to create the state and national parks, beginning with Yosemite. By virtue of his extensive pre-Civil War travels and writings, Olmsted was, furthermore, an authority on the antebellum South.⁴
4. Stevenson, E.: *Park Maker: A Life of Frederick Law Olmsted*. New York, Macmillan, 1977.
 5. The order was signed by Simon Cameron, Secretary of War, on June 9, 1861. Four days later Lincoln countersigned the order with the laconic notation "I approve the above." At this early stage Lincoln saw the Commission as his "Fifth Wheel," a term which would later become the title of an informative book on the Commission.⁶
 6. Maxwell, W. Q.: *Lincoln's Fifth Wheel: The Political History of the United States Sanitary Commission*. London, Longmans Green, 1956.
 7. [Collected Papers, 1862-1864.] *Military Medical and Surgical Essays*. Prepared for the United States Sanitary Commission. Washington, D.C., 1865. About half the essays, including Metcalfe's, were republished in French. See Evans, T. W.: *Essays d'Hygiene et de Therapeutique Militaires*. Présentés à la Commission Sanitaire des Etats-Unis. Masson, Paris, 1865.
 8. *Minutes of the U.S. Sanitary Commission*. Washington, D.C., 1861. See seventh session, December 3, 1861, pp. 77-79.
 9. Metcalfe, J. T.: Report of a committee of the associate members of The Sanitary Commission. *The Nature and Treatment of Miasmatic Fevers*. In: *Military Medical and Surgical Essays*, New York, Balliere, 1862.
 10. King, A. F. A.: Insects and disease—mosquitoes and malaria. *Pop. Sci. Monthly* 23: 644-58, 1883.
 11. King, A. F. A.: The prevention of malarial diseases, illustrating *inter alia* the conservation function of ague. *Bull. Philos. Soc. Wash.* 6: 5-10, 1883.
 12. Howard, L. O.: A fifty-year sketch history of medical entomology. pp. 565-586. In: *Annual Reports Smithsonian Institution*. Washington, D.C., Govt. Print. Off., 1921 [1922].
 13. Howard, L. O.: A history of applied entomology. *Smithsonian Misc. Coll.* 84, pub. No. 3065, 1930.
 14. Nuttall, G. H. F.: On the role of insects, arachnids and myriapods, as carriers in the spread of bacterial and parasitic diseases of man and animals. A critical and historical study. *Johns Hopkins Hosp. Rep.* 8: 1-154, 1900.
 15. Charles, S. T.: Albert F. A. King (1841-1914), an armchair scientist. *J. Hist. Med. Allied Sci.* 24: 23-26, 1968.
 16. As mentioned earlier, neither the Commission's minutes nor its other publications stipulate the extent of Olmsted's responsibility for the *Essays*, although his name is attached to them. Of the thousands of Olmsted papers in the Library of Congress, only a few relate to the Commission. Olmsted's Commission papers were lost in a fire in 1863. (Library of Congress Register, MS Division, Card 63-65420, 1963.)
 17. Olmsted, F. L. and Weeks, H. C.: Mosquitoes and how to abate them. *Am. Civic Assoc.* Leaflet No. 8, 1911. Privately printed.